## EGS5—ECS to Landsat 7 Interoperability Confidence Test

Overview

System interfaces between Landsat 7 and the ECS provide the means for transferring Landsat 7 data and for sending messages supporting data transfer. Additionally, these interfaces support exchange of information concerning system status, user activity, product pricing, directory and guide information. This thread provides end-to-end tests for all the interfaces and will verify that all transfers are successful and that the data are made available to end users.

The Landsat 7 elements that have system interfaces to the ECS are: the LPS, IAS, MMO, MOC, and the IGSs. Exhibit EGS5.1 provides a list of the ECS-Landsat 7 system interface data flows, identifying source and destination for each flow. These interfaces are fully supported by ECS Release B.0. Early interface tests performed with ECS Release A verify the ability to transfer messages and test data files between LPS and ECS.

Additionally, Landsat 7 indirectly interfaces with the ECS via the EDC DAAC Advertising Service and Document Data Server (TBR) where Landsat 7 Directory and Guide Information reside.

| Source | Destination | System Interface Data Flows | ECS Release Applicability |
|---|---|---|---|
| LPS | ECS | Data Availability Notice<br>Level 0R Data<br>Level 0R Inventory Metadata<br>Level 0R Browse | Release A - Fully met<br>Rel A - Partially met/B.0 - Fully met<br>Rel A - Partially met/B.0 - Fully met<br>Rel A - Partially met/B.0 - Fully met |
| ECS | LPS | Acknowledgment | Release A - Fully met |
| IAS | ECS | Calibration Parameters with Metadata Update | Release B.0 - Fully met |
| MMO | ECS | Product Price Information<br>System Management Status | Release B.0 - Fully met<br>Release B.0 - Fully met |
| ECS | MMO | System Management Status<br>Statistics and Reports | Release B.0 - Fully met<br>Release B.0 - Fully met |
| IGSs [1] | ECS | IGS Inventory Metadata<br>IGS Browse | Release B.0 - Fully met<br>Release B.0 - Fully met |
| ECS | MOC | Level 0 Inventory Metadata | Release B.0 - Fully met |
| IAS | Landsat 7 Advertising Service | Landsat 7 Directory Information | Release B.0 - Fully met |
| Landsat 7 | Document Data Server | Landsat 7 Guide Information and IAS Reports | Release B.0 - Fully met |

Note 1. The IGS/ECS transfers are to be accomplished through physical media only as of this writing.

## Exhibit EGS5.1. ECS– Landsat 7 System Interfaces

Test Objectives:

The objectives of this test are to:

- Verify the ability of the ECS to interface with the LPS and the IAS to transfer Level 0R data using Level 0R test data
- Verify the ability of the ECS to interface with the LPS and the IAS to transfer Level 0R inventory metadata using test data,
- Verify the ability of the ECS to interface with the LPS and the IAS to transfer Level 0R browse data using test data,
- Verify the ability of the ECS to interface with the MMO to exchange system-status messages and metadata.

Before this set of tests is conducted, the interfaces specified in ICT 8 (ECS to Landsat 7 Interface Confidence Test) must be tested and passed.

Requirements to be Verified:

| | | | | |
|---|---|---|---|---|
| Release A | LAND-0050#A | LAND-0060#A | LAND-0070#A | LAND-0085#A |
| | LAND-0150#A | LAND-0170#A | LAND-0185#A | |
| Release B.0 | LAND-0015#B | LAND-0020#B | LAND-0050#B | LAND-0060#B |
| | LAND-0070#B | LAND-0085#B | LAND-0090#B | LAND-0100#B |
| | LAND-0110#B | LAND-0115#B | LAND-0120#B | LAND-0125#B |
| | LAND-0130#B | LAND-0140#B | LAND-0150#B | LAND-0160#B |
| | LAND-0170#B | LAND-0180#B | LAND-0185#B | LAND-0201#B |
| | LAND-0210#B | LAND-0240#B | | |

Test Configuration:

Hardware and software configurations at the ECS EDC DAAC are managed and tracked by the Maintenance and Operations (M&O) organization at that site. The most current configuration status report will be obtained prior to the start of testing and will be referenced in the test report.

Exhibit EGS5.2 shows the topology relevant to the data flows between the Landsat 7 system and ECS.

Support Requirements

a. Institutional Support
   Elements: LGS, LPS, EDC DAAC, IAS, MOC

Hardware: Nascom, data lines as requested, circuit switching system, message switching system, voice between elements

b. Personnel Support:
M&O personnel at EDC DAAC
EDOS M&O support personnel at EDOS Facility
I&T TC

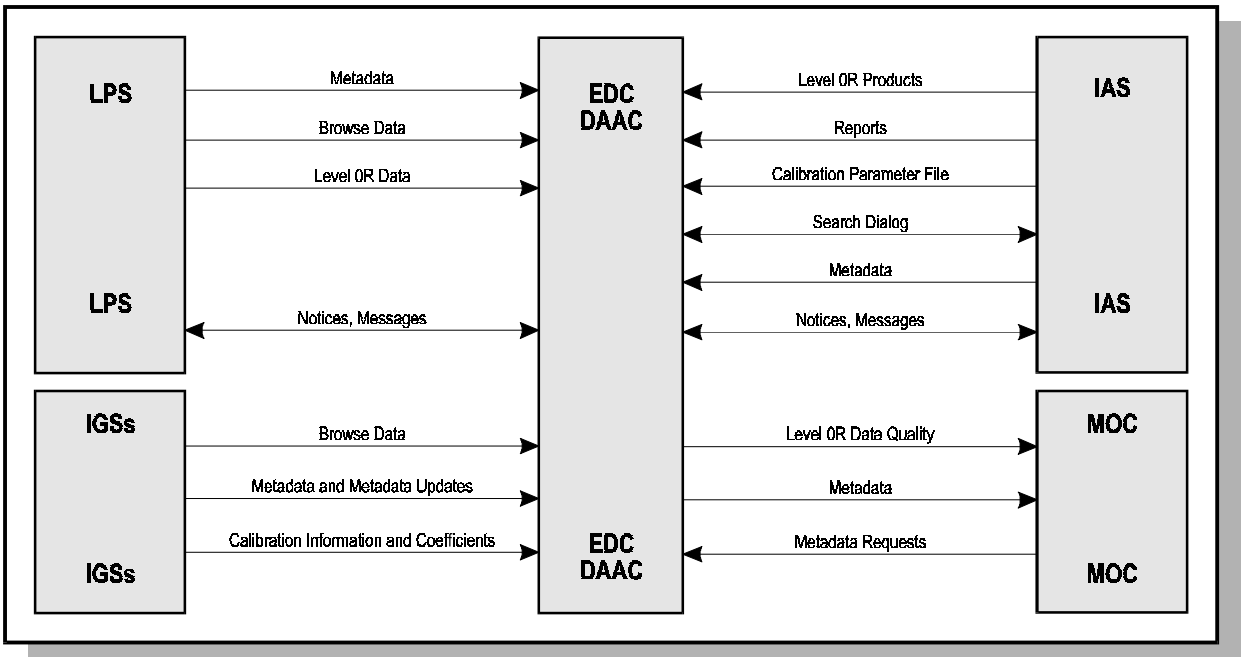


**EXHIBIT EGS5.2. Landsat 7-to-ECS Interface Topology**

c. Test Data Descriptions (from Landsat 7 ICD, 209-CD-013-002)

| Description | Source | Destination |
|---|---|---|
| Level 0R data | LPS | ECS |
| Level 0R inventory metadata | LPS | ECS |

Test data are used to validate EDOS data formatting and to accomplish end-to-end testing of both operational mission data and operations management data.

d. Communications
EBnet, Nascom, and voice.

e. Test Tools:
Network monitor, OpenView tool

Test Cases:

a. General Procedure

Exhibit EGS5.3 is a listing of the sequence of message and data transfers between LPS and the ECS EDC DAAC, i.e., the data flows. Steps 7, 8, 9, and 10, 11, are to be used in this series of tests. The other steps are tested under ICT8 (Interface Confidence Test) above in this document.

| Step # | Source | Destination | Data Flow |
|---|---|---|---|
| *1* | *LPS* | *ECS* | *TCP connection establishment* |
| 2 | LPS | ECS | Authentication request |
| 3 | ECS | LPS | Authentication response |
| 4 | LPS | ECS | Data availability notice |
| 5 | ECS | LPS | Data availability acknowledgment |
| *6* | *LPS* | *ECS* | *TCP connection termination* |
| ***7*** | ***ECS*** | ***LPS*** | ***Open FTP daemon (for ECS pull)*** |
| **8** | **ECS** | **LPS** | **FTP (m)get** |
| **9** | **LPS** | **ECS** | **Transfer data files** |
| ***10*** | ***ECS*** | ***LPS*** | ***Close FTP daemon*** |
| *11* | *ECS* | *LPS* | *TCP connection establishment* |
| 12 | ECS | LPS | Authentication request |
| 13 | LPS | ECS | Authentication response |
| 14 | ECS | LPS | Data delivery notice |
| 15 | LPS | ECS | Data delivery acknowledgment |
| *16* | *ECS* | *LPS* | *TCP connection termination* |

**EXHIBIT EGS5.3. Data Flows Between LPS and ECS**

b. Specific Tests:

**EGS5.01. LPS to ECS EDC DAAC Basic Test (Release A and B.0)**

Requirements to be Verified:

| | | | | |
|---|---|---|---|---|
| Release A | LAND-0050#A | LAND-0060#A | LAND-0070#A | LAND-0085#A |
| | LAND-0150#A | LAND-0170#A | LAND-0185#A | |
| Release B.0 | LAND-0050#B | LAND-0060#B | LAND-0070#B | LAND-0085#B |
| | LAND-0150#B | LAND-0170#B | LAND-0180#B | LAND-0185#B |
| | LAND-0240#B | | | |

This test is intended to verify the end-to-end capability of successfully accomplishing an unattended transfer of Landsat 7 information from LPS to the EDC DAAC, where it will be made

available for users. A single simulated Landsat product will be transferred in this test. See Exhibit EGS5.4 for the system topology appropriate to this test.

Verify that each of the steps 7–10 in the data flow table are initiated successfully, completed successfully, and properly interpreted by the receiver. Examine all applicable logs. In particular, verify that the FTP file transfer of the test product file pulled by EDC from LPS is byte-for-byte identical with the LPS source file and that it (and any attendant metadata and browse data) is properly archived and made available to users.

**EXHIBIT EGS5.4. LPS-to-ECS Interface Topology for Tests EGS5.01 and EGS5.02**

**EGS5.02. LPS to ECS EDC DAAC Operational Simulation Test (Release A and B.0)**

Requirements to be Verified:

| | | | | |
|---|---|---|---|---|
| Release A | LAND-0050#A | LAND-0060#A | LAND-0070#A | LAND-0085#A |
| | LAND-0150#A | LAND-0170#A | LAND-0185#A | |
| Release B.0 | LAND-0050#B | LAND-0060#B | LAND-0070#B | LAND-0085#B |
| | LAND-0150#B | LAND-0170#B | LAND-0180#B | LAND-0185#B |
| | LAND-0201#B | LAND-0240#B | | |

This test is intended to verify the end-to-end capability of successfully accomplishing unattended transfer of Landsat 7 information to the EDC DAAC, where it will be made available for users. Many simulated Landsat 7 products will be transferred in this test. See Exhibit EGS5.4 for the system topology appropriate to this test.

Verify that each of the steps 7–10 in the data flow table are initiated successfully, completed successfully, and properly interpreted by the receiver for a sequence of files staged at LPS constructed to simulate the timing and availability of the expected operational processing and staging. Examine all applicable logs. In particular, verify that the FTP file transfer of each of the test product files pulled by EDC from LPS is byte-for-byte identical with the corresponding LPS source file and that each file (and any attendant metadata and browse data) is properly archived and made available to users.

**EGS5.03. Data Exchange Between the IGS and the ECS. (Release B.0 only)—TBR**

Requirements to be Verified:

| | | | | |
|---|---|---|---|---|
| Release B.0 | LAND-0090#B | LAND-0100#B | LAND-0150#B | LAND-0160#B |
| | LAND-0170#B | LAND-0180#B | LAND-0240#B | |

The Landsat 7 IGS–ECS interface uses physical media for transfer of IGS metadata and browse data from the IGSs to the ECS. The ECS provides hard media ingest as described in the Release B.0 SDPS Ingest Subsystem (INS) Design Specification for the ECS Project. The ECS supports ingest from different types of hard media, with 8-mm tape as the standard at the EDC. The hard media received by the ECS must provide information describing the data being transferred in a standard Delivery Record file format. Data products transferred on physical media are to be delivered to ECS via available delivery services; e.g., United States Postal Services, Federal Express, or others. ECS ingests and archives Landsat 7 data delivered on physical media and received in good condition. The ECS is not accountable for IGS data that does not arrive at the EDC DAAC nor for monitoring which IGS data should arrive.

This physical transfer of data on physical media will not be tested. EGS5.03 is to be kept in this document to provide for any future ECS or Landsat 7 modifications.

**EGS5.04. Data Exchange Between the IAS and the ECS. (Release B.0 only)—TBR**

Requirements to be Verified:

| | | | | |
|---|---|---|---|---|
| Release B.0 | LAND-0110#B | LAND-0115#B | LAND-0150#B | LAND-0170#B |
| | LAND-0180#B | LAND-0185#B | LAND-0240#B | |

Data exchange between the Landsat 7 IAS and ECS consists of calibration parameter files and reports being sent from IAS to ECS.. Data transfer is accomplished through the use of ECS interactive network ingest process, as defined in the Release B.0 SDPS Ingest Subsystem (INS) Design Specification for the ECS Project. This process is designed to provide authorized science users and other designated sources (e.g. Landsat 7 IAS) with the ability to manually identify data to be ingested. As an interactive network ingest user, the IAS places the data in a designated location within an IAS file server or workstation and requests that ECS at the EDC DAAC perform an ftp get of the data. Interactive network ingest uses an ECS Ingest GUI (Graphical User Interface) to create data delivery information in a standard manner. The interface does however require human intervention for entering the delivery information via the GUI.

IAS also transfers its image assessment reports to the ECS Document Data Server utilizing the interactive network ingest GUI. Connectivity to the ECS Document Data Server is established though the EDC Exchange LAN. This connection is an IAS responsibility. ECS registered users have access to the Landsat 7 guide information on the ECS Document Data Server using the web (HTML/HTTP).

IAS-ECS interactive network ingest is a manually driven electronic data exchange. IAS will access the ECS Ingest GUI application through the EDC Exchange LAN. Through the ECS Ingest GUI, the IAS completes an ECS network ingest request form, which creates a standard Delivery Record, using HTML. The Delivery Record, when processed, serves as a DAN for ingesting IAS-provided data. The Delivery Record is submitted to ECS using HTTP. The Ingest GUI interface displays ingest acknowledgment of the DAN receipt and notification of ingest completion. For a data pull by ECS, the ingest request form completed and transmitted. This form conveys the requisite information that ECS needs to transfer the data from an IAS location (source name, node name, directory, etc.).

After file transfer using ftp, the IAS will send the IAS Delivery Record to the ECS. This message notifies the ECS that data are available for ingest in the location designated in the Delivery Record. The IAS Delivery Record contains information consistent with the information provided in a LPS DAN, but it is tailored for the ECS interactive network ingest process. It describes each of the files delivered and other delivery information.

IAS generates four types of reports as a user advisory service; calibration reports, assessments reports, problem reports, and summary reports. Calibration, assessment, and problem reports are created on an as needed basis. Summary reports are generated monthly, quarterly, and annually. The monthly report provides the users with a summary the overall Level 0R product quality. The quarterly reports provides a description of the calibration file updates. The annual report describes the general status of the system. Whenever the calibration parameters are updated, IAS generates an advisory report on an as needed basis. IAS places these reports on the ECS Document Data Server via a web interface using the interactive network GUI.

Exchange of data on 8-mm tape will be used for data transfer backup. The ECS will provide hard-media ingest as described in the Release B.0 SDPS Ingest Subsystem (INS) Design Specification for the ECS Project. The hard media received by the ECS must provide information describing the data being transferred. This information will be provided in standard Delivery Record PVL that relates the same information as provided in the IAS Delivery Record used with the interactive network ingest process. Data products will be copied to media using a UNIX “tar” command for creating a “tarfile”, i.e., tape archive file. Physical media tapes are to be hand-carried to the ECS from the IAS on-site at the EDC. The ECS ingests and archives the IAS data delivered on physical media and received in good condition.

**EGS5.05. Data Exchange Between MMO and the ECS (Release B.0 only)—TBR**

Requirements to be Verified:

| | | | | |
|---|---|---|---|---|
| Release B.0 | LAND-0015#B | LAND-0120#B | LAND-0125#B | LAND-0130#B |
| | LAND-0140#B | LAND-0150#B | LAND-0170#B | LAND-0180#B |
| | LAND-0185#B | LAND-0240#B | | |

Data exchange between the MMO and the ECS consists of product price information and reports containing statistics reports that are compiled over seven separate areas of measured performance. The seven areas of measured performance are: 1) Images, 2) System Performance, 3) Orders, 4) Metadata, 5) Storage, 6) Customer Services, and 7) Errors. System operation summary performance reports for each of these areas are generated on a daily and weekly basis at given time of day. The time of day is an operator selectable parameter. Reports are similarly generated for quarterly, semiannual, and annual reporting periods

The MMO-ECS data exchange is accomplished through Internet data transfer, hard copy mail delivery, soft copy on physical media, or email. Product price data is transferred from MMO to ECS as an attached file to an email message. Exchange of system management status is accomplished through Internet data transfer, or email.

### EGS5.06. Data Exchange Between the Landsat 7 and the ECS Advertising Service and the ECS Document Data Server (Release B.0 only)

Requirements to be Verified:

| | | | | |
|---|---|---|---|---|
| Release B.0 | LAND-0020#B | LAND-0150#B | LAND-0170#B | LAND-0180#B |
| | LAND-0240#B | | | |

As a result of having the Landsat 7 inventory metadata available to ECS users through a Science Data Server, the directory level metadata will also be sent to the ECS Advertising Service as a product advertisement. ECS users can search available Landsat 7 directory information through the ECS Advertising Service interface. Landsat 7 can place URLs, that provide directory information from a web page directory, on the ECS Advertising Server. This process is described in technical paper, External Data Provider Options, 442-TP-001-001.

Landsat 7 has the capability to transfer Landsat 7 guide information to the ECS Document Data Server as a registered user. Connectivity to the ECS Document Data Server for this data transfer is a Landsat 7 responsibility.